## NOTES

1. Papers selected for inclusion in General Sessions will be available at the Conference in the following official languages of the United Nations: English, French, Russian and Spanish.

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# MULTICELLULAR GLASS AS A STRUCTURAL ELEMENT IN DESERT REGIONS

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SUMMARY

Multicellular glass is alveolate and has closed pores, being made by partial fusion of glass powder to which has been added a frothing agent such as carbon or certain carbonates. The very wide range of expanded glass products obtained by this technique can have a specific gravity from 0.1 right up to solid glass at 2.5. Until now only the low densities have been sought for, and the products have been used in architecture as an inelastic insulator, for example for flat roofs covered with a concrete screed.

Recent work in the Research Department of the Compagnie de Saint-Gobain has reversed this tendency, using multicellular glass as a self-carrying material which can have high crushing strength, good insulation, a shape which allows it to be built into masonry, and a surface finish which can resist the weather without paint.

Vitreous products of this type have the advantage that for their manufacture they use simple materials, sand and limestone, which are abundant in Nature, particularly in desert regions. In the present state of knowledge, sea salt cannot directly provide the alkaline oxides needed, but sodium carbonate which is still used, represents only a small fraction which needs to be transported. The fuel oils needed for heating the furnaces (even if not locally obtained) are easily transported.

The economic unit of production is 10 to 20 tons a day, which is a considerable quantity of multicellular glass.

The glass does not need to be as homogeneous and as pure as that for glassmakers, and can therefore be cheaply made with small, high-output furnaces.

Experimental investigation into different multicellular glasses shows that much more is gained in mechanical strength than is lost in thermal insulation.

One element of domestic comfort, as important as the insulation value of walls, is their thermal inertia.

All these considerations have led to the choice of a specific weight of 0.45. At this density, porosity is more than 80%, and all the pores are closed, so that it is completely impervious.

The thermal conductivity is 0.16 calorie/kg/m/$m^2$/hour/°C. This is equivalent with a thickness of 10 cm to an ordinary masonry wall 40 - 50 cm thick. The crushing strength is 75 kg/$cm^2$. The pores do not appear on the surface because manufacture in a closed mould forms a hard surface crust which resists wind abrasion and moderate mechanical shock. This facing can be coloured in various ways.

The product can replace the conventional concrete building block, to build light-weight structures which are comfortable and easy to build.

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